

Listing of the Claims

This listing of claims will replace all prior versions, and listings of claims in the application.

1. (Cancelled)

2. (Currently Amended) A Pol I type *Thermotoga neapolitana* DNA polymerase having reduced or no misincorporation of nucleotides during nucleic acid synthesis, with a modification in the O-helix defined by SEQ ID NO. 1, ~~comprising~~ consisting essentially of:

amino acid position Arg722 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val and/or amino acid position Lys726 of a *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val, or

~~amino acid position Arg722 of a *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val and amino acid position Phe730 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Pro, Ser, Thr, Trp, Tyr, and Val,~~

wherein said modification results in the reduction or elimination of misincorporation of nucleotides during nucleic acid synthesis.

3.-5. (Cancelled)

6. (Previously Presented) The polymerase of claim 2, further comprising one or more modifications to reduce or eliminate one or more activities selected from the group consisting of:

- (a) the 3'→5' exonuclease activity of the polymerase;
- (b) the 5'→3' exonuclease activity of the polymerase; and
- (c) the discriminatory activity against one or more

dideoxynucleotides.

7. (Previously Presented) The polymerase of claim 2, wherein said polymerase is modified to reduce or eliminate 3'→5' exonuclease activity.

8. (Previously Presented) The polymerase of claim 2, wherein said polymerase is modified to reduce or eliminate discriminatory activity against one or more dideoxynucleotides.

9. (Previously Presented) The polymerase of claim 2, wherein said polymerase is modified to reduce or eliminate 5'→3' exonuclease activity.

10.-13. (Cancelled)

14. (Previously Presented) The polymerase of claim 2, wherein Arg722 is substituted with an amino acid selected from the group consisting of Asn, Asp, Cys, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Ser, Thr, Tyr and Val.

15.-16. (Cancelled)

17. (Previously Presented) The polymerase of claim 2, wherein Lys726 is substituted with an amino acid selected from the group consisting of Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr and Val.

18.-19. (Cancelled)

20. (Currently amended) The polymerase of claim 2, wherein Arg722 is substituted with an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Tyr and Val, and/or wherein Lys726 is substituted with an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr and Val.

21.-36. (Cancelled)

37. (Previously Presented) A kit for amplifying, synthesizing, or sequencing a DNA molecule comprising one or more of the modified polymerases of claim 2.

38. (Original) The kit of claim 37, further comprising one or more dideoxyribonucleoside triphosphates.

39. (Original) The kit of claim 37, further comprising one or more deoxyribonucleoside triphosphates.

40. (Original) The kit of claim 38, further comprising one or more deoxyribonucleoside triphosphates.

41.-68. (Cancelled)

69. (Previously Presented) The polymerase of claim 14, wherein Arg722 is substituted with an amino acid selected from the group consisting of Lys, His, Asn, Tyr, and Leu.

70. (Cancelled)

71.-74. (Canceled)

75. (Previously Presented) The polymerase of claim 17, wherein Lys726 is substituted with Arg.

76.-82. (Cancelled)